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INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

Cyprus : *Dolycoris baccarum* L. (1).

During the last three years damage has been caused by this Pentatomid to various crops in the hill villages of Cyprus ; it appears to have been present before that time, but not in such serious numbers.

The insects appear towards the end of May and damage potatoes, beans, peas and other vegetables, and also cherries and vines to a less extent. Cereals are too far advanced by early in June for these insects to attack them, although they do so to a certain extent when they first appear.

The damage is confined to villages lying between about 2000 feet and 3500 feet, although the insects appear to occur in small numbers throughout the Island.

At the end of June the *Dolycoris* leave the cultivated fields and fly in swarms to the summit of Mount Olympus (6400 feet, the highest point in the Island) and in smaller numbers to two or three other summits.

On these summits the insects are to be found in masses during the summer, living under loose stones, and many ofthem appear to spend the winter in these localities, where they are under snow for some weeks. Large numbers have descended to the cultivated fields again in October this year, causing further damage to vegetables.

The details of the life history are not yet fully known, but no feeding or breeding appear to take place while the insects are on the mountain summits, and egg laying and the young stages appear to occur only during the short period in May and June when the insects are in the cultivated fields.

Measures found effective against this insect are collecting with nets or shaking into tins containing water and a little petroleum, and dusting with " Cyanogas 'A' dust ". Villagers are usually unwilling to collect the insects as, although simple and effective, it requires a certain amount of work, and they also object to the cost of the " Cyanogas " dusting, with the result that little is done. The insects also move from field to field so that one collection or dusting may not be sufficient.

A campaign has been carried out during the last two summers while the insects are on Mount Olympus, and very considerable numbers have been destroyed then

* In this, as in the two next chapters, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Mr. H. M. MORRIS, M. Sc., F. E. S., Government Entomologist, Nicosia, Cyprus.

by means of " Cyanogas ", but owing to the large area of rough ground over which they are spread, this campaign has not had as complete results as had been hoped.

In examinations of *Dolycoris* carried out at various times an average of 50 % of the insects have been found to contain parasitic larvae, the adults of which have been found to be the Tachinid *Gymnosoma rotundatum* L. and another at present unidentified Tachinid. The puparia of these Tachinids appear also to be subjected to severe parasitism.

Cyprus : Locust Campaign in 1929 (1).

The annual campaign against locusts (for the first time in charge of the Government Entomologist) commenced on April 1st and ended on June 9th, 1929. The first hatchings were reported on March 21st at the eastern end of the central plain, the hatching being a few days later at the western end of the plain.

The locusts occur chiefly in this plain, most of which is affected : they also occur in the Akrotiri and Carpas Peninsulas.

The campaign was carried out, as in the previous few years, by the purchase of locusts which were collected in hand nets. A small amount of spraying with a solution of sodium arsenite and molasses was also carried out.

The most important species is *Dociostaurus maroccanus* Thnb. which occurs chiefly in the plain, but *Calliptamus italicus* L. is also abundant in some areas, chiefly in the above Peninsulas, appearing about a month later than *Dociostaurus*. Damage to crops has been caused in some years by *Tettigonia viridissima* L. and other Tettigoniidae, but such damage was not important this year and was met by supplying poison bait of bran, molasses and sodium arsenite after the close of the campaign by purchase. *Schistocerca gregaria* Forsk. (*peregrina* Ol.) is only known to have occurred in Cyprus in 1915, when large swarms invaded the island during the severe outbreak in Syria and Palestine.

A total of 64,752 okes (almost 81 tons) of locusts were collected and destroyed this year and 780 donums (260 acres) were sprayed. Locusts were less abundant than in the last three years.

Trials with a poison bait of bran, molasses and sodium arsenite gave satisfactory results and it is intended to extend the use of this material next season.

'Iraq : Note on the Campaign conducted in Northern Area against Moroccan Locusts *(Dociostaurus maroccanus)* (2).

In readiness for the 1928 locust campaign locations of the infested areas which would have to receive attention were made in 1927, principally when the locusts were actually laying eggs during May and June, 1927. The total areas located aggregated 153 387 donums, equivalent to 30 677.4 hectares. The technical staff of the Locust Department in 'Iraq was as follows :—

1 Locust Officer.
5 Asstt. Locust Officers.
44 Locust Inspectors.
50 Qolchies.

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(1) Communication from the official correspondent of the Institute, Mr. H. M. Morris, M. Sc., F. E. S., Government Entomologist, Nicosia, Cyprus.

(2) Communication from Mr. H. G. D. Rooke, Chief Locust Officer, 'Iraq, forwarded by Mr. J. F. Webster, B. A., Inspector General of Agriculture, Baghdad, 'Iraq, official correspondent of the Institute.

The embryo stage of the locust in 'Iraq is from May-June in the one year until March in the following year. During this stage this year the maximum temperature recorded at Mosul was 115.1°F. in August, 1927 and the minimum 24°F. in January, 1928 whilst the rainfall from July, 1927 until the end of May, 1928 was 272.1 mm.

Hatching of the locusts became general from 20th March, 1928 until 31st March, 1928 and those that hatched in the hill districts were some ten to fifteen days later. In the more southern parts of the infested areas, where there had been a shortage of rainfall and where there was in consequence no natural vegetation on the infested areas inspections showed that although the locusts had hatched they had entirely disappeared. Three reasons are advanced for this remarkable disappearance, viz :—

1) Death from starvation due to lack of vegetation.

3) Devoured by birds. (Note : Prior to date of hatching large numbers of birds, particularly the crested lark, were seen in the vicinity of these breeding grounds, whereas some 8 days after hatching there was no sign of birds anywhere in these areas) ; and

3) The appearance of large swarms of Nejdi locusts (*Schistocerca peregrina* = *Schist. gregaria*) coincidentally with the date of hatching which the bedouin declare devoured the newly hatched locusts.

The means of control adopted were as follows :—

1. Poison Bait.
2. Ploughing up of infested areas.
3. Trenching.
4. Spraying swarms with fuel oil.

1. Poison Bait.

During the 1926 and 1927 campaigns experimental work with this means of control was conducted and a bait composed of sodium arsenite, date or sugar molasses and bran was found to give excellent results. The following quantities of these commodities were obtained in readiness for the campaign :—

Sodium arsenite	157 ½	tons.
Date and / or sugar molasses	335	»
Bran	2,408	»

One hundred and sixteen poison centres were opened and the above materials were distributed. The bait was prepared in the proportion of one part sodium arsenite, two parts molasses and fifteen parts bran. From the time when the locusts entered their second stage, i. e. approximately six days after date of hatching, and formed up as a swarm, the results obtained from spreading poisoned bait in front of advancing swarms were found to be excellent, 100 % annihilations having been accomplished in several parts of the country. One belt of locusts, 21 miles in length, near Kirkuk was entirely destroyed in five days during their third and fourth stages. Another belt of 12 miles in length was similarly dealt with in the Mosul Liwa. Owing to the shortage of vegetation in the Kirkuk area spreading of bait was carried out throughout the whole day and was found to be effective. In other areas where vegetation existed, spreading was done early in the morning before the swarm had commenced to move and in the late evening when the swarm had rested for the night. It was found that 5 lbs. of sodium arsenite, with the necessary quantities of molasses and bran, were sufficient for a line of locusts in their third stage measuring approximately 1,000 yards.

The Chief Locust Officer of the Union of South Africa visited 'Iraq on deputation during the locust season and demonstrated the method employed in that country of spraying poison solution on natural vegetation through which the swarms would pass. The results obtained then were not so good as those obtained by the poison bait method, but subsequent application of this method shows that excellent results are produced when used during the first two stages (approximately 12-14 days from date of hatching) of the locusts.

A certain amount of loss of stock occurred but this was mainly due to negligence on the part of those in charge of the animals as all poisoned areas were demarked by the erection of mounds of earth around such areas.

2. Ploughing up of infested areas.

In all 68,202 donums of infected areas were ploughed up within the cultivated zone. By ploughing infested areas it is estimated that at least 50 % of the eggs therein are destroyed either by mechanical action or by the exposure of same to climatic conditions or by birds, and furthermore, locusts will not lay eggs again in such areas as they require a firm compact soil for this operation. Ploughing in the desert regions is not recommended.

3. Trenching.

Owing to the excellent results obtained from the poison bait method, very little trenching was done during the 1928 campaign. One large swarm in the Kifri area in their fourth stage measuring about one mile by two miles was very successfully dealt with by this means. Trenches in front of the advancing swarm were dug about 15 yards in length and from 4 to 5 feet in width and depth. Zinc sheets were laid flat on the ground overlapping the sides of the trench. Labour was then stretched out at a tangent to the ends of the trench and by waving bits of cloth the advancing swarm converged into the trench and the locusts were trapped by the zinc sheets that had been laid overlapping the sides of the trench. Trenching needs organised labour, and in a country where labour is scarce, this means cannot be regarded as effective when dealing with the locust outbreak as a whole.

4. Spraying swarms with fuel oil.

Fuel oil is an excellent contact poison on locusts. It is necessary, however, to actually touch the locusts with oil. Spraying under pressure is essential otherwise a huge wastage occurs. A party of men working against locusts can effectively bait ten times the area that they can do with oil in the same time.

General.

Three squadrons of the 'Iraq Army assisted throughout the campaign. Supervision of work in the desert areas was greatly facilitated by the fact that the Royal Air Force at Mosul very kindly placed at the disposal of the Locust Officer a machine whenever visits to the desert areas were necessary. Owing to the shortage of vegetation it was possible to spot one swarm in its fourth stage from the air. This was the 12 mile swarm in the Mosul Liwa referred to earlier. Cars were immediately sent out and the swarm dealt with. The Police Authorities gave all possible assistance in seeing that the orders of Government regarding the measures to be adopted were carried out. The damage to winter crops was again practically nil owing to the fact that it was possible to tackle swarms as they came into close proximity to crops. By the time locusts reach the wing the winter crop of barley is nor-

mally ripe and that of wheat usually sufficiently hard in the ear as to escape serious damage by flying locusts. Summer crops of tobacco, and vegetables, suffered a little from flying locusts.

Natural enemies of the locusts in 'Iraq.

The beetle, *Trichodes laminatus*, and the fly, *Thyridanthrax* sp. were again present generally all over the country and, in their larval stage, attacked the locust eggs. The Kangarro rat was found to dig up the eggs and destroy them in the plains whereas in the hill districts it was non-existent. A bird, identified by the British Museum (Natural History), London, as the cream coloured courser (*Cursorius cursor cursor* formerly *C. gallicus gallicus*) a desert loving bird, was also found to pick the eggs out of the ground and devour them. This again occurred mainly in the desert areas. This bird belongs to a group including a very similar bird *Pratincola glareola*, which is known as the 'Locust Bird' in South Africa where it destroys swarms of locusts. In 'Iraq however, the bird referred to above has only been seen to attack the locust eggs. Starlings were also found to extirpate locust eggs after the rains had fallen and softened the ground and were also seen in huge numbers following the plough when the ploughing of infested areas was in process. Crested larks, starlings, crows and storks were, shortly after hatching, seen to be feeding voraciously on young hoppers, but seemed to tire of them and leave them alone in their later stages.

VARIOUS QUESTIONS

Dusting and steeping of cereal seeds.

Algeria (1). — In 1925-1926 we started some experiments on the control of bunt of wheat (*Tilletia Caries*) by dusting and steeping the seed at the experimental field of the Agricultural Institute of Maison-Carrée, Algiers, and the results obtained up to the present are given in the following table :—

Salts or commercial disinfectants used	Number of contaminated plants	Number of contaminated ears	Observations
	%	%	
Non-disinfected unsorted wheat	*		* One contaminated clump in a line of 25 m. (the percentage has not been estimated).
Control (grain dusted with spores of bunt)	64	23	
Anhydrous copper sulphate	0	0	
1 % solution of copper sulphate, contact 15 minutes	0	0	
Schloesing Powder	0	0	
Copper carbonate	**	0	** Two contaminated clumps.
Powder B (Commerce)	58	21	
Caffaro Powder	0	0	

(1) Communication from Prof. J. CHRESTIAN and Prof. L. DUCELLIER, of the Institut Agricole d'Algérie, Maison-Carrée (Alger), transmitted by Prof. J. CHRESTIAN, official correspondent of the Institute.

England (1). — No official trials of ' proprietary ' dusting powders have been made.

A series of bunt-prevention trials using copper sulphate and formaldehyde solution and copper carbonate in ' dust ' form has been carried out cooperatively by the Plant Pathological Laboratory and the Provincial Advisers in Mycology, and the results are at the moment being written up for publication. Briefly stated they show that treatment with copper carbonate powder is as efficacious in preventing bunt as are copper sulphate and formaldehyde solutions, provided the seed grain is not too seriously contaminated. The chief disadvantage of the dust treatment is that it requires a special machine, escaping dust being injurious to the operators. This point requires very special attention with such dusts as contain compounds of mercury.

Belgium (2). — In 1923-1924 methodical comparative trials were carried out at the State Phytopathological Station at Gembloux on different methods of treating wheat seed against bunt (*Tilletia Tritici*).

The programme and results were as follows :—

Series A. — Autumn wheat of the variety ' Trésor ' coated with bunt spores of the same year in the proportion of 1 spore to 1000 wheat seeds (sown 10 November 1923) . —

	Percentage germination	Percentage of infected ears
1. Control not treated	85	35
2. Immersion in 0.5 % solution of copper sulphate for 15 hours and in milk of lime for 5 minutes	93	0
3. Immersion in 1 % solution of copper sulphate for 1 hour and milk of lime for 5 minutes	89	0
4. Immersion in 5 % solution of copper sulphate for 10 minutes and milk of lime for 5 minutes	87	0
5. Immersion in 5 % solution of copper sulphate ; no lime	69	0
6. Spraying with 6 % solution of copper sulphate, stirring for 10 minutes	85	0
7. Immersion in a 0.3 % solution of formalin for 10 minutes ; seed kept in a moist heap for 4 hours	85	0
8. Dusting with copper carbonate in the proportion of 200 gm. to 100 kg. ; stirring for 5 minutes	91	0

Series B. — Spring wheat of the variety ' Manitoba ' mixed with partially crushed bunted wheat, in the proportion of 1 infected seed to 500 healthy seeds (sown 29 April 1924) :—

	Percentage germination	Percentage of infected ears
1. Control, not treated	81	15
2. Dusted with copper carbonate, 200 gm. per 100 kg., stirring for 10 minutes	82	3

(1) Communication from the Ministry of Agriculture and Fisheries, London, official correspondent of the Institute.

(2) Communication from the official correspondent of the Institute, Mr. E. MARCHAL, Directeur de la Station de Phytopathologie de l'Etat, Gembloux.

These experiments show that the copper carbonate used for disinfecting wheat-seed coated with bunt spores gives results which are in no way inferior to those obtained by recognised methods of immersion in copper sulphate or formalin.

When the wheat seed contains ' false ' bunted seeds in addition to bunt spores the effects of dusting are appreciably reduced and steeping methods are more beneficial.

The fact remains, however, that in normal conditions when the wheat-seed has been freed from ' false ' bunted seeds dusting with copper carbonate appears to fulfil all the requirements for an ideal disinfectant : it is effective, does not detract from germinative capacity of the seed and, further, is entirely practical.

As a result of the popularisation of these facts by the Belgian agricultural papers the disinfection of wheat-seed by dusting with copper carbonate is widely practiced and undoubtedly is tending to replace old steeping methods.

Of recent years various other copper compounds have been recommended for dusting seeds, such as copper acetate, oxycloride of copper and a number of foreign patent products ; it appears useful therefore to submit all these products to a methodical testing. These experiments have been started and will yield results in July and August, 1930.

Spain (1). — The method usually used in Spain for the prevention of bunt of wheat (' tizón o caries del trigo ', *Tilletia Tritici* or *T. Caries*) is seed disinfection with copper sulphate, which sometimes retards germination and causes loss of germinating capacity.

Of recent years trials have been made with dry disinfection. The disinfectants used are copper carbonate and neutral copper acetate, both in the form of a fine powder (the powder must be passed through a sieve with a mesh of 200 to a French inch).

The substance we recommend is copper carbonate, which must contain 50 % of copper as a minimum and be in the form of a very fine powder, as specified above.

Mercury compounds sold under special trade names are effective but much more expensive.

Dutch East Indies (2). — Cereal crops being of little importance in the Dutch East Indies the phytopathological institutions are not concerned with dusting or steeping grain.

Italy (3). — A report has recently been published on all publications which have appeared in Italy and elsewhere on fungicidal treatments against bunt and smut of cereals with special regard to their influence on the germinating capacity of the seed (see VIVOLI, GIULIO. Gli anticrittogamici contro la carie ed il carbone dei cereali dal punto di vista della loro influenza sul potere germinativo delle cariossidi. *Annali di Tecnica Agraria*, Portici, 1929, anno I, fasc. IV, pp. 469-493 ; anno I e II, fasc. V, pp. 614-630 ; fasc. VI, pp. 742-792 ; bibliografia, pp. 761-792).

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(1) Communication from the official correspondents of the Institute, Messrs. Miguel BENLLOCH Y MARTÍNEZ, Ingeniero Agrónomo, Profesor en la Escuela de Ingenieros Agrónomos, Director de la Estación Central de Patología Vegetal, La Moncloa, Madrid, and José DEL CAÑIZO Y GÓMEZ, Ingeniero Agrónomo y Licenciado en Ciencias Naturales, at the same Station.

(2) Communication from the official correspondent of the Institute, Dr. C. J. J. VAN HALL, Baarn.

(3) Communication from Dr. M. MENCACCI, transmitted by the Royal Station of Plant Pathology, Rome, official correspondent of the Institute.

With regard to specific fungicidal effect against bunt of wheat (*Tilletia Tritici* and *T. laevis*) the products which have been principally tested in recent years and which have given the best results are the following:— ' Uspulun ' for liquid treatment, ' Uspulun ' for dry treatment, ' Germisan ', ' Polvere Caffaro ', ' Kalimat ', ' Abavit ', ' Tillantin ' (trade name ' Uspulun-Universal ') for liquid treatment and ' Tillantin ' for dry treatment.

The numerous workers who have experimented with these products are unanimous in attributing to them in general an adequate efficacy in bunt prevention; but on the other hand opinions are not always in agreement with regard to the possible reduction in the percentage of germination resulting from the different treatments.

Many hold that liquid treatments reduce germinative capacity. That copper sulphate solutions certainly do is admitted by everyone. It has not been definitely proved, as some people hold, that liquid treatments increase production. In any case if a liquid treatment is used, spraying the seed is recommended rather than immersion, because immersion nearly always causes reduction in percentage germination and in germinative vigour.

It has however never been ascertained that treatments with powders produce any adverse effect on germination. In the numerous experiments on the use of the powders enumerated above an increased production has been shown in addition to highly effective fungicidal action.

In the experiments carried out by the Royal Station of Plant Pathology at Rome, which are in accord with those of other workers, the best results, both with regard to safeguarding against bunt infection and to favourable effects on germination, have been obtained by dry treatment with ' Uspulun ', ' Tillantin ' and ' Polvere Caffaro '. It has also been shown in a number of experiments that in comparison with liquid treatments and with the controls dry treatments increase wheat production (some results are about to be published, others will be found in the following works :— Mencacci, M. Esperienze per determinare l'azione di alcuni trattamenti al grano. *Bollettino della Regia Stazione di Patologia vegetale* [di Roma], Firenze, 1926, anno IV, n. ser,, n. 3, pp. 216-235, figg. 1-2. — Idem. Trattamenti dei semi di grano, avena, orzo con *Uspulun*, *Germisan*, *Kalimat* e *Abavit*. *Ibid.*, 1928, anno VIII, n. 2, pp. 221-225).

In consideration therefore of decided practical advantages of dry over liquid treatments these powder products, which have now reached a high degree of perfection specially in fineness and adhesive capacity, are being increasingly used and will end by completely replacing copper sulphate and all other products which are used in the liquid state, with undoubted benefit to cereal cultivation.

The cereal diseases against which seed treatment gives certain control are bunt of wheat (*T. Tritici* and *T. laevis*), loose smut of oats (*Ustilago Avenae*), covered smut of oats (*Ust. laevis*), and bunt of rye (*T. Secalis*).

Seed treatment against the following diseases has however not given definite control but may in some cases limit the damage :— loose smut of wheat (*Ust. Tritici*), smut of maize (*Ust. Maydis*), stripe smut of rye (*Urocystis occulta*), covered smut of barley (*Ust. Hordei*), and loose smut of barley (*Ust. nuda*).

Switzerland (1). — Every year the Agricultural Experiment Station at Oerlikon carries out seed disinfecting trials with new disinfectants. Up to the present it

(1) Communication from the official correspondent of the Institute, Dr. E. Neuweiler, Schweizerische Landwirtschaftliche Versuchsanstalt, Oerlikon-Zürich, Schweiz.

has not been generally found that disinfectants for dusting are effective in checking the development of bunt of wheat, although certain of them, such as 'Abavit B' and 'Porzol' kill the spores. In Switzerland liquid disinfectants are preferable; and treatment by immersion is better than steeping. The best results have been obtained by immersing seeds in solutions of 0.1 % formalin for 3 hours, 0.25 % 'Fungolit' for 1 hour, 0.25 % 'Germisan' for ½ hour, and 0.2 % 'Uspulun-Universal' for ½ hour.

EURYGASTER *SPP. AND THE DAMAGE IT CAUSES TO CEREAL CROPS IN DIFFERENT COUNTRIES* *

Algeria (1). — *Eurygaster integriceps* has never been noted hitherto in Algeria. Other species are found in the Colony: *E. maurus* L., *E. austriacus* Schrk. and *E. hottentotus* F.

They occur on grasses, but have not been reported to my knowledge as attacking cereals.

Germany (2). — Up to the present no species of *Eurygaster* has caused damage to cereals in Germany. According to STICHEL (Illustrierte Bestimmungstabellen der deutschen Wanzen, Berlin 1925, S. 15-16) the three following species occur in Germany:—

(1) *Eur. maura* L. The host plants indicated for this species are:— *Artemisia campestris, Centaurea, Senecio, Carduus, Cirsium, Secale, Erica* and *Juniperus*. This species occurs in East Prussia, Silesia, Brandenburg, Mecklemburg, Sleswig-Holstein, the region of the lower Elbe, Brunswick, Anhalt, Thuringia, Hesse, Westphalia, Oldenburg, Rhineland, Wurttemberg and Bavaria.

(2) *Eur. austriaca* Schrk. This species is found on gravelly or sandy soil on the following plants: — *Verbascum, Salvia, Thymus Serpyllum, Artemisia campestris*. It has been recorded in East Prussia, Silesia, Brandenburg, Mecklemburg, Sleswig. Holstein, Saxony, Thuringia, Hesse, Westphalia, Rhineland, Baden, Wurttemberg and Bavaria.

(3) *Eur. fokkeri* Put. This species has been recorded in Bavaria.

Bermuda (3). — As far as I am aware and as far as any records reveal, no species of *Eurygaster* have been reported in Bermuda.

Cirenaica (4). — No species of *Eurygaster* has up to the present attacked the cereal crops in the Colony.

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* Continued from No. 2.

(1) Communication from the official correspondent of the Institute, Mr. M. DELASSUS, Inspecteur de la defense des cultures, Alger.

(2) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

(3) Communication from Mr. H. S CUNNINGHAM, Plant Pathologist, Department of Agriculture, Agricultural Station, Paget East, Bermuda, to the International Institute of Agriculture.

(4) Communication from the official correspondent of the Institute, Mr. G. KRUGER, Entomologist to the R. Ufficio per i Servizî agrarî della Cirenaica, Bengasi.

Scotland (1). — We have no record of the occurrence of *Eurygaster* in wheat or other cereal crops in Scotland.

United States of America (2). — There are but two species recorded from our fauna, *E. alternata* Say and *E. shoshone* Kirkaldy.

E. alternata has been recorded from Maine southward to New Jersey and westward to Oregon and California. We have records from the following States: Maine, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Michigan, Indiana, Illinois, Missouri, Nebraska, Montana, Wyoming, Colorado, New Mexico, Utah, Washington, Oregon, and California.

As far as our records go, this species has never been found upon any economic plant. It is usually collected in damp, boggy places, and practically nothing is known of its food habits.

The species, *E. shoshone* was described from specimens collected in Utah, and the original describer records it from Utah, Idaho, and Nevada. Nothing is known of its food habits and it has never been reported as an economic pest.

There are no records in this country ot any parasites of either species.

India (3). — *Eurygaster integriceps* is not known to occur within Indian limits.

We have no Indian specimens of any species of *Eurygaster* in our collection and have no record of any damage to wheat in India by these insects.

India (Bombay Presidency) (4). — *Eurygaster* spp. are never a pest on this side of the Presidency either on wheat or any other type of cereals as far as my information goes.

Dutch East Indies (5). — The presence of *Eurygaster* spp. has not as yet been recorded in the Dutch East Indies.

Luxemburg (Grand Duchy of) (6). — Two species of *Eurygaster* belong to our fauna :— *E. maurus* and *E. hottentotus*.

These two species, the first of which is fairly common, occur on bushes and cereals, but do not however cause any appreciable damage.

Sierra Leone (7). — *Eurygaster* spp. have not yet been encountered in this country.

(1) Communication from the Department of Agriculture for Scotland, Edinburgh, official correspondent of the Institute.

(2) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

(3) Communication from the official correspondent of the International Institute of Agriculture, Mr. T. Bainbrigge Fletcher, R. N., F. L. S., F. E. S., F. Z. S., Imperial Entomologist, Entomological Section, Agricultural Research Institute, Pusa, Bihar (India).

(4) Communication from the official correspondent of the Institute, Mr. T. N. Jhaveri, L. Ag., Assistant Professor of Entomology, College of Agriculture, Poona, Bombay Presidency, India.

(5) Communication from the official correspondent of the Institute, Dr. C. J. J. van Hall, Baarn.

(6) Communication from the official correspondent of the Institute, Mr. Victor Ferrant, Officer in Charge of the Phytopathological Service, Luxemburg.

(7) Communication from the official correspondent of the Institute, Mr. E. Hargreaves, Entomologist, Agricultural Department, Experimental Farm, Njala, via Mano, Sierra Leone.

Switzerland (1). — *Eurygaster integriceps* has not hitherto to our knowledge damaged the wheat crops in French Switzerland.

Jugoslavia (Dalmatia) (2). — Neither *Eurygaster integriceps* nor any related species occurs among the insect pests recorded for Dalmatia.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Philippine Islands. — The Administrative Order No. 52 (revised), approved on 17 July 1929, provides as follows :—

Section 1. — If upon investigation by the Director of Agriculture, or his authorized agent, or the president of the municipality concerned, dead, dying or decaying trunks of coconuts, buri and other palms, trunks of soft woods, heaps of sawdust, manure, bagasse, straw and other organic matter or rubbish or any one of these organic substances are found to exist in the coconut grove, plantation, or premises of any person, firm or corporation and said organic substances are actually found to harbor or to be the breeding places of the black beetle (*Oryctes rhinoceros*) or if such organic substances, in the opinion of the Director of Agriculture or his authorized agent or the president of the municipality concerned, would serve as the breeding places of the black beetle and thus endanger the neighboring coconut grove or plantation belonging to another, it shall be the duty of the owner, lessee, or person in charge of such coconut grove, plantation or premises after having been notified in writing by the Director of Agriculture or his authorized agent to remove and dispose of such organic substances in accordance with the respective methods prescribed in Section 2 of this Order. A copy of said written notice shall be sent to the president of the municipality concerned, who shall, if so requested, cooperate with the Director of Agriculture in the enforcement of the provisions of this Order.

Sec. 2. — Sawdust shall either be thrown into the sea or river or entirely burned up. Manure shall be spread to dry or buried at least two feet deep. Dead, dying or decaying trunks of coconuts, buri and other palms, trunks of soft wood, bagasse, straw and other organic matter or rubbish shall be thoroughly burned up or disposed of in any other manner appropriate to the circumstances in accordance with the recommendations of the Director of Agriculture or his authorized agent.

Sec. 3. — In order to carry out the provisions of this Order, the Director of Agriculture, or his duly authorized agent, or the president of the municipality concerned, or the latter's authorized representative, will at all times, for the purpose of inspection, have access to or upon any coconut grove, plantation or premises where any of the organic substances mentioned in Section 1 hereof is known or suspected to exist.

Sec. 4. — Failure or refusal to comply with the written notification of the

(1) Communication from the official correspondent of the Institute, Dr. H. Faes, Director of the Federal Viticultural Experiment Station, Lausanne (Montagibert).

(2) Communication from the official correspondent of the Institute, Mr. P. Novak, Director of the Entomological Station, Split.

Director of Agriculture or of his authorized agent within a period of three weeks or twenty-one days from the date of receipt of said written notification shall be considered as prima facie evidence of a determination to evade the obligation imposed by virtue of this Order and shall render the person so notified liable to prosecution, and upon conviction he shall suffer the penalty provided in Section 13 of Act No. 3027, which is a fine not exceeding one thousand pesos or imprisonment not exceeding six months, or both such fine and imprisonment in the discretion of the court.

Sec. 5. — Any violation of this Administrative Order shall be immediately reported to and be investigated by the Director of Agriculture, or by his authorized agent, or by the president of the municipality concerned. (*The Philippine Agricultural Review*, Published by the Bureau of Agriculture, Department of Agriculture and Natural Resources, Manila, 1929, Vol. XXII, No. 3, pp. 281-283).

*** By Administrative Order No. 34-2 approved on 17 August 1929, the importation of fruits of the species listed herewith is strictly prohibited from the following countries infested with the Mediterranean fruit fly (*Ceratitis capitata*): — the Hawaiian Islands, Spain, France, Italy, Sicily, Greece, Malta, Turkey, Syria, Palestine, Egypt, Tripoli, Tunis, Algeria, Cape Colony, Natal, British East Africa, Madagascar, Brazil, Argentina, Bermuda Islands, the Azores, Madeira Islands, Canary Islands, Cape Verde Islands, Dahomey, Nigeria, the Congo, Delagoa Bay, Rhodesia, Uganda Protectorate, Mauritius, Western Australia, New South Wales, Victoria, Queensland, New Zealand, Tasmania, and Florida, United States of America. Fruits from noninfested countries will be admitted subject to inspection for other injurious insect pests and parasitic fungi.

Any importation of fruits of the foregoing species in contravention of the provisions of this Order shall be seized by the plant quarantine inspectors appointed by the Director of Agriculture who will order the immediate exportation of such fruits or their immediate destruction according to the decision of the Director of Agriculture.

Importation of fruits of the foregoing species from the quarantined countries may be made for promoting the fruitgrowing industry in this country in accordance with Section 2 of Administrative Order No. 29 of the Bureau of Agriculture, provided that such importations be made in small amounts and through the Director of Agriculture, who will have such plant materials treated under quarantine until they have been shown to be free from all injurious insects and parasitic fungi.

Any person who violates any of the provisions contained in this Administrative Order shall, upon conviction thereof, be punished by a fine not exceeding one thousand pesos, or by imprisonment not exceeding six months, or by both such fine and imprisonment, in the discretion of the court.

List of Fruits. — Sapodilla (*Achras sapota*), Acordia (*Acordia* sp.), Soursop (*Annona muricata*), Sugar palm (*Arenga saccharifera*), Breadfruit (*Artocarpus incisa*), Carambola (*Averrhoa carambola*), Ball kamani (*Calophyllum inophyllum*), Bell pepper (*Capsicum* sp.), Papaya (*Carica papaya*), Dwarf papaya (*Carica quercifolia*), Carissa (*Carissa arduina*), Sapota (*Casimiroa edulis*), Chinese inkberry (*Cestrum* sp.), Star apple (*Chrysophyllum cainito*), Damson plum (*Chrysophyllum oliviforme*), Chinese orange (*Citrus japonica*), Kumquat (*Citrus japonica*), Tangerine (*Citrus nobilis*), Mandarin (*Citrus nobilis*), Lime (*Citrus medica limetta*), Lemon (*Citrus medica limonum*), Grapefruit (*Citrus decumana*), Shaddock (*Citrus decumana*), Orange (*Citrus aurantium*), Sour orange (*Citrus aurantium* var.

amara), Wampi (*Clausena wampi*), Quince (*Cydonia vulgaris*), Persimmon (*Diospyrus decandra*), Loquat (*Eriobotrya japonica*), Brazilian plum or Spanish Cherry (*Eugenia brasiliensis*), Rose apple (*Eugenia jambos*), Surinam cherry (*Eugenia michelii*), French cherry (*Eugenia uniflora*), Fig (*Ficus carica*), Mangosteen (*Garcinia mangostana*), Mangosteen (*Garcinia xanthochymus*), Cultivated cotton (*Gossypium* sp.), Mountain apple (*Jambosa malaccensis*), Palm (*Latania löddigesii*), Tomato (*Lycopersicum esculentum*), Liches nut (*Litchi chinensis*), Mango (*Mangifera indica*), Elengi tree (*Mimusops elengi*), Mock orange (*Murraya exotica*), Banana (*Musa* sp.) Noronhia (*Noronhia emarginata*), Ochrosia (*Ochrosia elliptica*), Prickly pear (*Opuntia vulgaris*), Passion vine (*Passiflora coerulea*), Avocado (*Persea gratissima*), Date palm (*Phoenix dactylifera*), Strawberry guava (*Psidium cattleyanum*), Sweet red and white lemon guavas (*Psidium guajava*), Common guava (*Psidium guajava pomiferum*), Waiawi (*Psidium guajava pyriferum*), Peach (*Prunus persica*), Nectarines (*Prunus persica* var. *nectarina*), Apricot (*Prunus armeniaca*), Plum (*Prunus* sp.), Pomegranate (*Punica granatum*), Apple (*Pyrus* sp.), Pear (*Pyrus* sp.), Sandalwood (*Santalum freycinetianum*), Eggplant (*Solanum melongena*), Wi (*Spondias dulcis*), Natal plum (*Terminalia chebula*), Tropical almond or winged kamani (*Terminalia catappa*), Bestill (*Thevetia neriifolia*), Grape (*Vitis labrusca*), Coffee (*Coffea* sp.). (*The Philippine Agricultural Review*, Published by the Bureau of Agriculture, Department of Agriculture and Natural Resources, Manila, 1929, Vol. XXII, No. 3, pp. 277-279).

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